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- Fig. 4. *Podozamites* ? Glen Cove.
 Figs. 5, 7. *Cinnamomum Sezannense* Wat. f. 5, Glen Cove; f. 7, Sea Cliff.
 Fig. 6. Catkin of *Salix* ? Glen Cove.
 Fig. 8. *Tricalycites papyraceus* Newb. mss. Lloyd's Neck.
 Fig. 9. *Typha* ? Lloyd's Neck.
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 Fig. 13. *Zizyphus Lewisiana* n. sp. Oak Neck.

Contributions to American Bryology, V.

BY ELIZABETH G. BRITTON.

NOTES ON THE NORTH AMERICAN SPECIES OF WEISSIA (ULOTA).

WEISSIA CURVIFOLIA (Wahl.) Lindb.

Orthotrichum curvifolium Wahl. Fl. Lapp. 365 (1812).

Ulotia curvifolia Brid. Bryol. Univ. 1: 302 (1826).

Ulotia Americana Mitt. Journ. Linn. Soc. 8: 26 (1865).

Ulotia Americana, Mitt. was described from specimens collected by Drummond and distributed as No. 153, labeled *Orthotrichum crispum*, Hedw. The habitat is given as "On trees in Upper Canada; and upon rocks called Hell's Gates, below Norway House." As the label indicates, the specimens are mixed; and Mitten states that in his set *U. Bruchii*, not *U. crispa*, was distributed. In our set there are two distinct patches, the one on the right evidently grew on trees, for it contains *U. crispa* and *Orthotrichum speciosum*. The other piece grew on rocks. At first sight, from its darker color, and less curly leaves, it would seem to be *U. Hutchinsiae*, and it is with this species that Venturi compared it in the Revue Bryologique (1892), as it was part of this specimen that I sent to him at that time. He says that "the character which distinguishes it from *U. Hutchinsiae* is in leaves which are not erect appressed, but distinctly curved as in the leaves of *U. curvifolia*." Now it is with the latter species that the comparison should have been made, and I think that Dr. Venturi would have come to the same conclusion that I have, that they are the same species.

I have compared our specimens with the description of *U. curvifolia* given by Limpricht in the Laumboose p. 28, and find only one discrepancy, he says the cilia have only one row of cells, ours have two. Schimper figures *U. curvifolia* in the Bryologia Europæa with two, and the Manual states they have two. I have also compared the leaves with those of *U. curvifolia*, from Rabenhorst's Bryotheca Europæa, Nos. 182 and 222, and with our specimens they are identical. In this connection it will be remembered that the Manual says that *U. curvifolia* has been collected by Drummond in North America, credited by Schimper. I sent to Kew to ask if Schimper's specimens were numbered, but they are not. In one of Drummond's sets at Kew, however, there is the same mixture of specimens as in our No. 153.

I have appealed to Mr. Mitten twice to reconsider this question, and sent him a portion of our specimen of Drummond's No. 153, but he has not done so. Therefore we must reason the question out for ourselves. Mitten says in his original description that *U. Americana* "differs from *U. curvifolia*, Wahl., in the areolation of the base of the leaf and from *U. crispa* and *U. crispula* in the same particular, as well as in the form of the base of the leaves." Now evidently the first comparison was with the species to which he considered it most closely allied, the second with the species with which the specimens were mixed and confused in distribution. It is to the latter group, however, that Lesquereux and James in the Manual referred it, as in their set they had only a tree species, allied to *U. crispa*.

Macoun's set also has only *U. crispa*. Of course it is possible that Mitten did find a different species mixed in his 153, from the ones which I have found in our set and Hooker's set at Kew, but it will be remembered that it has not been collected since. Whereas *U. curvifolia* has been collected on the shore of Lake Huron by Macoun, and one of the localities given by Mitten for *U. Americana*, is Lake Huron collected by Todd.

The original description reads as follows:

"*Ulotia Americana*, Monoica, foliis siccitate tortis appressis e basi subovali longe lanceolatis sensim acutis nervo carinatis marginibus recurvis, saepe suberosis, cellulis basi ad margines seriebus circiter hyalinis oblongis, in media angustis luteis, e superioribus rotundatis diametro circiter $\frac{1}{400}$ unciae metientibus perichaetiali-

bus apice latioribus obtusiusculis, theca elliptica plicata, operculo conico acuminato, peristomio dentibus bigeminatis 8, ciliis aequilongis angustis 8, calyptra breviter appresse ramentosa."

Now as Venturi says, in the *Revue Bryologique*, our specimens of 153 agree with this description, and the erose margins of the upper part of the leaves is due to the prominent papillæ. Therefore unless Mitten can prove it to the contrary, I will maintain the synonymy as given above.

Prof. Macoun in his Catalogue says he has "never observed a species of *Ulota* that grew indiscriminately on rocks and trees, and therefore proposes to place *U. Americana* at Hell's Gate, and hence a rock species," but he makes the same mistake that Limpricht in his *Laubmoose* does, and refers to it *U. Hutchinsiae* as well, citing also Drummond's No. 147, evidently without critically comparing the specimens. Now *U. Hutchinsiae*, though usually a rock species does occasionally grow on tress, according to Limpricht, l. c., and we have specimens from E. Faxon collected at Brookline, Mass., on trees, as also from A. Commons, near Wilmington, Delaware. Austin collected it on trees near Closter, and last summer I sent to Venturi specimens from the summit of White Top Mountain, Virginia, that grew in dense spruce woods both on rocks and trees, and he pronounced them the same as European *Hutchinsiae*, though at the time I did not feel satisfied to call them that species.

ULOTA SCABRIDA KINDB. Macoun. Cat. Can. Pl. 6, 83
(1892).

In Macoun's Canadian mosses No. 115 was distributed as *U. Americana*, but later in the Catalogue it was described as a new species, *U. scabrida*, Kindb., on account of its densely papillose leaves. These specimens in our set are very papillose, with erose margins, and they seem to me to agree with Drummond's No. 153, as nearly as young *Ulotas* will agree with older specimens of the same species. Furthermore the specimens agree with Kindberg's description as far as it goes, though I cannot assent to his comparisons, for he seems to me to have said the reverse of what he should have said, when he states that they resemble *U. crispa* more than *U. curvifolia*, and are not much allied to the latter. I

have compared them with specimens of *U. curvifolia*, collected by Breidler, in the Austrian Alps, and with Limpricht's description in his Laubmoose, and *U. scabrida* differs in having a longer, more slender beak to the lid, and the cilia are of two rows of cells, not one as described by Limpricht. Why the comparison with *U. crispa* was made at all I do not understand, seeing the species grew on rocks, and the leaves are not circinnate, unless Macoun has distributed a totally different set of specimens from the ones that were seen by Kindberg. The following measurements and description may enable some other students to determine whether their specimens are the same as in our set.

Leaves "comparatively short as in *U. curvifolia*" (1.5–2.5 mm), "basal cells elongate, alar" (inflated), (5–7 rows of) "marginal distinct and hyaline. Capsule sub-oblong" (less than 1 mm. long) "passing into a long collum" (constricted at neck when dry) "teeth not reflexed, pale" (bigeminate, striolate, perforate, cilia 8, as long as the teeth, of two rows of cells, mouth bordered above the insertion of the peristome, bands of the capsule of four rows of large cells), "calyptra lobate, very hairy" (hairs papillose), "pedicel long" (2 mm., exserted). The parts of the description in brackets are mine. Now Drummond's 153 shows no lid, but in all else they agree with *U. scabrida*. Macoun collected the specimens in the Rocky Mountains near Hector.

It may be that Kindberg in describing *U. scabrida* as a new species different from *U. Americana* Mitt., as it was originally distributed, thought that the latter species was related to *U. crispa*, as the Manual says, but even then I do not understand his comparison.

WEISSIA AMERICANA (Beauv.) Lindb.

Orthotrichum Americanum Beauv. Prodr. 81 (1805).

Orthotrichum Hutchinsiae J. E. Smith, Eng. Bot. t. 2523 (1813).

Orthotrichum strictum Brid. Bryol. Univ. 1: 289 (1826).

Ulota Hutchinsiae Hammar, Mon. Orth. Suec. 27 (1852).

Weissia Americana Lindb. Musc. Scand. 28 (1879).

Ulota Americana Limpricht; Rab. Kryptfl. 4: Part 2, 21 (1890) not Mitten.

Through the kindness of M. Autran, of the Boissier Herbarium, I have seen the specimens from which Schwægrichen figured *Orthotrichum Americanum*, Beauv., in the Supplement table 138 (1824), and find mounted on the same sheet portions of the type

received from Beauvois. They were collected in Pennsylvania by Muhlenberg, and are identical with the species which we have been calling *U. Hutchinsiae* in North America.

The confusion which has arisen is in consequence of the use of the same specific name by Mitten for *U. curvifolia* (*U. Americana*, Mitt.) 59 years after it had been used by Palisot de Beauvois for *U. Hutchinsiae*. With singular fatality it has spread into every modern text-book, catalogue and magazine which has referred to the subject, even to the last report of the American Naturalist of the Proceedings of the Madison meeting, where I am made to say just the opposite of what I did say. Braithwaite in his British mosses is the only one who seems to have understood Lindberg correctly, and he cites *Weissia Americana* (Beauv.) Lindb. for *Ulotia Hutchinsiae*, Smith, and does not refer to *Ulotia Americana*, Mitt.

The unfortunate part of it is that Limpricht in the Laubmoose (part 14, page 21, 1890) should have made the mistake of citing Mitten's *Ulotia Americana* in connection with this species, and that Venturi in the Revue Bryologique should not have made the comparison of the specimens which I sent him with *U. curvifolia*, and not with *U. Hutchinsiae*.

WEISSIA AMERICANA RUFESCENS n. var.

Plants more slender, green or brown not black, stems rufous tomentose, leaves less crowded, longer, often 3 cm. narrower, acuminate, upper cells more dense and obscure, lower golden brown, rectangular, not linear or sinuous, marginal shorter, not hyaline; seta 2 mm. long, neck tapering .75 mm. stomata few, small, theca pyriform, 1.5 long by 1 mm. broad, inflated, narrower at the mouth, ridges continuous of 3-6 rows of cells, broadest at the mouth, not prominent on mature capsules; peristome double, teeth reflexed when dry, white granulose, not trabeculate at apex, cilia eight of two rows of cells, fugacious; calyptra with short, glossy papillose hairs.

Summit of White Top, on trees in dense woods of *Picea Mariana* and *rubra*, mixed with *Dicranum longifolium*, *Zygodon viridissimus*, *W. ulophylla* and *Frullania Asa-Grayana*. Alt. 5,678 ft.

Differing in habitat and general aspect from the common form which grows on old stone fences, on erratic boulders and stones in woods forming black patches with *Hedwigia*; from var. *nigratum*,

(Br. & Sch.) Limpr., in the presence of cilia, and its habit of growing on trees in shade.

This is another of the cases so frequent in this genus, where the macroscopic differences are more distinct than the microscopic. We also have specimens collected at Raquette Lake, in the Adirondack Mountains N. Y., which at first sight resemble *W. curvifolia* more than *W. Americana*, but when compared with the normal form of the latter agree in the less papillose leaves, though having the brown color, slender stems and short capsules like the former. The leaves however are not as curved. Prof. Macoun has collected specimens "on trees at Goulay's Point, Lake Superior," which also differ quite markedly from the dense black form with elongated capsules of our Eastern States.

In Sullivan's herbarium there are also duplicates of these specimens labelled "*U. Hutchinsæ*," with the following note. "Macoun's No. 33 from Goulay's Point, Aug. 5, 1869. Capsule and pedicel not as figured in Br. Eu. Looks like *U. Barclayi*, Mitt.—See slide.—W. S. S."

WEISSIA COARCTATA (Beauv.) Lindb.

Orthotrichum coarctatum Beauv. Prod. 80 (1805).

Ulota Ludwigii Brid. Mant. 112 (1819).

Lindberg and Braithwaite cite the above synonymy. Limpricht doubts whether it is correct, cites *O. coarctatum* with a ? and says that the plant figured by Schwægrichen (Suppl. I. ii. 26, t. 52) is a different species. He cites this plate under *U. Bruchii*. The original description reads as follows:

Orth. coarctatum; caule suberecto ramoso, ramis inclinatis; foliis linearibus, siccitate crispis, costa integra notatis; pyxidibus erectis, pyriformibus; orificio striato, coarctato; calyptra pallida, hirta.

J'ai rapporté cette espèce de l'Amérique septentrionale. Elle a quelque rapporte avec l'*Orth. crispum*; mais elle en difère par la forme de l'urne et son orifice strié et rétréci.

It will be noted that the leaves are described as crisped, and that the plants are compared to *O. crispum*; but, on the other hand, the description of the capsules agrees with that of *U. Ludwigii*.

Schimper, in the *Bryologia Europea*, t. 227, figured for *Orthotrichum coarctatum*, Beauv., the species which Bridel (Bryol. Univ.

1: 794, 1816) described as *Ulotia Bruchii*. In the second edition of Schimper's Synopsis Muscorum (p. 301, 1876) he corrected this, and cites *O. coarctatum* Beauv. as a synonym of *U. Ludwigii*, and says that it agrees with the original description but not with Schwægrichen's figures. Under *U. Ludwigii*, he says that *O. coarctatum* (Beauv. et Schwægr.) which he united with *Bruchii* is a distinct species.

The plates in Schwægrichen's Supplement referred to show *U. Ludwigii* as we now understand it, and *t. 52* seems to be quite different. The capsules are quite unlike the previous plate of *Ludwigii*, but they do not seem long enough nor tapering enough to be *U. Bruchii*. It would be hard to say what they were meant for, though they are not *U. Ludwigii*. The locality given is on trunks of trees, communicated by Persoon and Richard from North America, mixed with *O. crispum*. Now *U. Bruchii* has a northerly range, and is rather a rare species. We have it from Canada and Alaska. *U. Ludwigii* and *crispa* are common and range down the Alleghenies to Georgia, frequently growing mixed together. I have sent specimens to the Delessert Herbarium, and asked to have the comparisons made for me; but we learn from M. Briquet, that none of Palisot de Beauvois' mosses are to be found in the Delessert Herbarium, so that we must accept the plate and explanation given by Schwægrichen, that *O. coarctatum* is the same as *U. Ludwigii*, and that it grew mixed with *U. crispa* and that would account for the description given by Beauvois.

WEISSIA PHYLLANTHA (Brid.) Lindb.

Ulotia phyllantha Brid. Mant. 113 (1819).

Weissia phyllantha Lindb. Musc. Scand. 28 (1879).

As no description of the fruit of this species has been published in any American periodical, it seems desirable to give it from the specimens from which it was originally described, supplemented by later observations from better specimens. Mr. Howell, sent two patches, measuring 3 inches across, each of which bore a few capsules, but they were so old and infested by fungi that I had great difficulty in securing a good peristome.

Plants dioecious, antheridia in superposed buds at intervals of 1 cm. apart; seta 4-5 mm. long, twisted to the right, erect or curved when dry; capsule 1-2 mm. long, ridges 8, of 4-6 rows of cells;

neck long, tapering; stomata abundant at the base of the sporesac, lid conic apiculate; peristome double, teeth recurved when dry, united in pairs, white, granulose-striolate, cilia 8, fugacious, a little shorter than the teeth of two rows of cells; calyptra 2 mm. long, hairs short appressed.

On trees Yaquina Bay, Oregon, Howell, New West Junction, Macoun in fruit.

All the Eastern specimens of this species are sterile, though it has been collected in Mt. Desert, Maine, by Mr. White; in Anticosti and Nova Scotia, by Macoun; Newfoundland, Waghorne. It has also been collected in fruit in Europe, at Killarney, by Schimper, and in the Jæger herbarium there is one specimen collected by Jensen in 1851, in Insula Mona, Denmark, labelled *O. jutlandicum*, which has seven young capsules, all with long curved pedicels and elongated necks. They grew in a small dense cushion 1 cm. across, but the label does not say whether on rocks or trees. As neither Limpricht nor Braithwaite cite these specimens, it seems worth noting.

WEISSIA MARITIMA (C. M. & K.).

Ulota maritima C. M. & Kindb.; Macoun, Cat. Can. Pl. 6, 84 (1892).

This species is said to differ from *U. phyllantha* in its short oval capsule with a short neck, shorter and thicker pedicel, curved when moist, the leaves long attenuate to the subulate point, distinctly papillose, the vein narrower, rough on back. The habitat also is on rocks, not on trees. The localities are mostly Western, excepting Miquelon, Delamare, and it is also credited to Sweden, but sterile.

We have examined all of Prof. Macoun's suite of specimens of this and *U. phyllantha* and find fruiting specimens of both in his collection. The finest of *U. maritima* are from Cape Breton, and not listed in his catalogue. There is a decided difference macroscopically between the two species. *U. phyllantha* was collected in fruit by Prof. Macoun at New West Junction, B. C., and the capsules are in better condition than those collected by Howell. These were compared with the Cape Breton specimens, presumably collected on rocks, though the label does not say so. Besides the differences noted above, the latter plants are smaller, darker

green or black, not yellow, with stems 5–10 mm. long, leaves 3–4 mm. long, shorter and less circinate when dry, and less papillose on the back of the vein (not more) than *phyllantha*, with the upper cells less distinct and the apex less acuminate. The seta is only 2 mm. long, the neck twisted, not tapering, whereas in *U. phyllantha* the seta is 5 mm. long including the long tapering neck. They are curved in both, perhaps more so in *phyllantha*. The capsules are shorter and more ovoid in *maritima*, but they are mature and full of spores, whereas those of *phyllantha* are old, empty and elongated.

The peristome is reflexed in both, with the cilia erect, but the teeth are longer in *phyllantha*, they are finely granulose and striolate in both, trabeculate at apex in *maritima*, and the cilia are long, carinate, of two rows of cells. The calyptra is brown at apex with long straight hairs.

On the whole, they seem to be distinct enough to separate; if we maintain *crispa* and *crispula* as distinct species, then these are. But the differences in color and size are not constant, for short dark plants have been collected on trees, though we have not seen any tall yellow ones from rocks.

In Jaeger's herbarium there are several specimens from Friesland which resemble *U. maritima* very closely, but they are sterile. Those collected in Norway by Lorentz also are small and dark, and grew on rocks.

One of the synonyms given by Braithwaite for *U. phyllantha* may antedate *U. maritima* Kindb. He cites *Gymnostomum viridissimum* Davies, from Wales but without habitat.

WEISSIA ULOPHYLLA Ehrh. Beitr. 1: 191 (1787).

Ulota connectens Kindb.; Macoun, Cat. Can. Pl. 6, 85 (1892).

Ulota camptopoda Kindb.; Macoun, Cat. 75 (1892), fide Macoun.*

It will be noted that the description in the catalogue of *U. connectens* is mainly of the leaves, and all it says of the capsules is

* In a letter dated January 3, 1894, Professor Macoun states that "Kindberg unites *Ulota camptopoda* and *connectens*, and I believe makes them both *Orthotrichum*."

that they are "dark brown, short, subovoid, not contracted at the mouth, costate, pedicel short, scarcely emergent. Calyptra densely hairy."

Prof. Macoun has sent us all his specimens of this species, and we also have examined his Canadian mosses No. 557.

We are amazed to find that these are simply old plants of what we have been calling *U. crista*, gathered in the autumn, with the old brown shrivelled capsules buried in the leaves, and pushed aside by the younger innovations, which bear at their summits the young and hairy calyptras of the next generation, just emerging. The capsules including the seta and vaginule measure 4 mm. and have the long tapering neck of this species, the peristome remains in fragments, and the ridges are prominent, of 4-5 rows of brown cells, with the spaces between them contracted and thin. We have compared the leaves also, and they agree. Furthermore we have specimens from various collectors and localities, in precisely this same stage of development, notably those collected on rocks! near Madison, Wisconsin, by Messrs. True and Cheney. (Date not given).

ULOTA CAMPTOPODA Kindb.; Macoun, Cat. 6, 85 (1892) Canadian mosses, No. 582.

We have seen the specimens cited above, and compared them with the description. The capsules are either too old or too young for satisfactory determination, but even on the old capsules we have seen cilia; the description says there are none! The comparisons with *U. maritima* and *U. Ludwigii* after the description are wild ones. It has no specific relation to either! Its alliance is clearly with *U. crista*, and it is to this species or *U. crispula* that it should be referred, but there are no capsules matured.

WEISSIA MEGALOSPORA (Vent).

Ulotia megalospora Vent. Bot. Centr. 44: 389 (1890) Hedwigia, 32: 269 (1893).

Dr. Venturi says that this is perhaps one of the most interesting mosses in Roll's collection. It has a cladogenous fruit as in *Ulotia Drummondii* and *U. Ludwigii*, but it corresponds to the group of *U. crista*, and *U. Bruchii* in the crisped leaves; it is re-

markable for its large spores, which are warty and reach the dimensions of *Encalypta*, .055-.061 mm., and the leaves end in a single cuspidate cell. The plant grew with other large species of *Orthotrichum* on the bark of trees and very little of it was collected.

Dr. Venturi has generously shared a portion of it with us; unfortunately this portion does not include a capsule, but from the description and leaves we have been able to determine that it is very nearly allied to *U. subulata* and *U. subulifolia* CM. & Kindb. We have not seen specimens of *U. subulata*, but we should not be surprised to find that these three species were one. Unfortunately Kindberg has no idea of the use of measures in descriptions, and never seems to look at the spores, but his description of *U. subulata*, as far as it goes, agrees with *U. megalospora*, which has precedence by two years.

ULOTA SUBULIFOLIA C. M. & Kindb.; Macoun, Cat.
6, 82 (1892).

The description of this species is most unsatisfactory, being only a comparative one, as follows:

"Differs from *U. subulata* in the stem being more branched, the leaves when dry twisted or subcrisped, sparingly papillose, revolute at the basal margin at least on one side; the basal cells elongate, alar indistinct; capsule very small, short-obovate, costate, finally subcylindric; pedicel not very long; calyptra nearly naked.

On small trees in thickets, Black's Farm, along the Coquilla river, near New Westminster Junction, B. C., April 26, 1889, Macoun."

We have received from Prof. Macoun fine specimens from this locality, numbered 127, which we have examined and measured. The following are our observations:

Plants small, light yellow; stems slender, creeping and tomentose at base, branches erect, 5-7 mm. high; leaves crisped when dry, spreading when moist, from an erect, ventricose base, 1-2 mm. long, narrowly acuminate, carinate with more or less recurved margins, vein thick ending below the cuspidate apex; cells bluntly papillose, upper rounded, .005-.008 mm.; lower longer, narrower, .013-.027 mm., often brown or yellow.

Autoicous, the antheridia in large, brown buds, with broad bracts. Seta long, slender, including the vaginule to tip of lid, 5-7 mm. Capsule small, 1 mm., when ripe ovoid, becoming elongated when empty, with a long tapering neck, which is twisted when dry; lid apiculate, beak long, .216 mm., bordered with yel-

low; capsules striate, the ridges of 4 rows of cells, yellow and much thickened; teeth united in pairs, reflexed when dry, finely granulose, appearing striolate, smoother and trabeculate at apex, cilia 8, as long as the teeth and smooth; spores brown, warty. .024-.037 mm.

The leaves are very variable in the same plants. The younger ones at the tips of the stems are very long acuminate, the older ones are much broader, sometimes only acute.

We have the same species collected by J. B. Leiberg on *Tsuga Pattoniana*, Traille River Valley, Idaho, received January, 1890, No. 234. Also on *Alnus rubra*, Nooksack River, Whatcom county, Washington, W. N. Suksdorf, July 11, 1890, No. 71.

Club-Root in Common Weeds.

In some instances it has heretofore been somewhat difficult to fully account for the almost perennial presence of Club-root (*Plasmodiophora Brassicæ* Wor.) in various cruciferous crops. Some fields of cabbage and turnip, in particular near New Brunswick, seemed to suggest that some of the cruciferous weeds might harbor the enemy, and with this suspicion in mind, strengthened by the knowledge of the wide range of hosts for the *Plasmodiophora* in the mustard family, Mr. J. A. Kelsey was asked to dig for the slime mould until, if possible, it was found. The lurking pest was not far to seek, and in a short time a hundred roots of the Shepherd's purse (*Bursa Pastoris*), and an equal number of the Hedge-mustard (*Sisymbrium vulgare*) were obtained in the vicinity of the infested cabbage and turnip fields.

Figure 1 shows a group of the *Bursa* roots affected with the *Plasmodiophora*. The roots of this weed are neither large nor fleshy like those of the turnip, and the galls are correspondingly small. Quite frequently the swollen portion is close below the crown, but in some cases the enlargement is midway of the root, and frequently there are smaller galls near the tips of the roots.

In *Sisymbrium* (figure 2) the galls are quite different in outline, being more nearly hemispherical and seemingly situated without any order. There may be three or more of the galls of equal size upon a single root. They are of a darker brown color than in the *Bursa*.